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ABSTRACT

This paper was designed to explore how the modeling of reflection by a teacher educator influences the development of preservice teachers' thinking and learning about teaching, and their subsequent reflective processes. The research was initiated to help student teachers develop an approach to teaching that might allow them to take more control of their own education and to encourage them to be deliberative and thoughtful about their pedagogy. The paper begins with a discussion of reflection with the educational literature. A case study of four student teachers follows, examining the effect of a model created to provide access to the teacher educator's thoughts on teaching using written journals and "thinking aloud." Examples form the students' journals are used to illustrate how the students used the model to reflect on their own teaching experiences. The data support the notion that modeling of reflection is possible and can be successfully incorporated into learning about teaching, and that modeling reflection, and reflection itself, were valued by the participants in this study. The findings indicate that reflection is something that, when understood and valued (by teacher educators and student teachers), can be developed through teacher education programs where teacher educators incorporate these principles into their teaching. In this manner they will encourage their student teachers to do likewise. Three appendices provide tables of the questionnaire results. (Contains 26 references.)
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Practicing what I preach: modelling reflective practice to student teachers.

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PRACTICING WHAT I PREACH: MODELLING REFLECTIVE PRACTICE TO
STUDENT TEACHERS

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INTRODUCTION

Because of the complexities of teaching and learning about teaching, various approaches to pre-service teacher education have evolved over the years. However, one aspect of teacher education that continually receives attention in both curriculum and research is the way teachers think about their practice. Since at least the time of Dewey, such thinking about practice has been termed reflection.

There has been a great deal of research into how reflective practitioners might best be developed. Most of this research has focussed on the value or success of some of the social and artifactual tools teacher education programs employ in an attempt to produce reflective practitioners (Richert, 1987). One area of this research that has moved beyond program structures has been the influence of student-teachers' supervisors during the field-based component of teacher education courses (MacKinnon, 1989). However, little has been done to explore the effect of modelling of reflection by a teacher educator on the development of student-teachers' own reflective practice.

Modelling in this study involves making the teacher educator's reflection on practice explicit for the student-teachers so that they can observe the thinking that underpins the learning they experience. To do this, a teacher

educator's journal was used as one form of access to this thinking, another was a 'thinking aloud' approach during teaching. Hence the student-teachers could be privy to the thoughts and feelings which influenced the teaching practice. This paper explores the relationships between this explicit modelling and student-teachers' reflection.

The one year, post-degree Diploma in Education (Dip. Ed.) is an ungraded course which has three periods of teaching practice, each of three full-time weeks, and course work which is divided into two major areas: Methods and Practice of Teaching, and Foundation Studies. Students participate in two Methods and Practice of Teaching subjects which are timetabled for two hours per week for the duration of the course. The Foundation Studies include Social Foundations of Schooling (SFS) and Teaching and Learning (TAL). The SFS subject examines contemporary schooling in its social and historical context and TAL is a subject which incorporates psychology and principles of teaching.

Students remain in the same TAL/SFS tutorial group for the whole year. Therefore, the same group of students is together for up to eight hours per week in their tutorial groups. The TAL group for which I was the tutor was used in this study. It comprised a random mix of students from the total Dip. Ed. cohort and involvement in the research was voluntary.

The research was initiated in response to a desire for pre-service teacher education programs (and teacher educators) to help student-teachers develop an approach to teaching that might allow them take more control of their own education, and to encourage them to be deliberative and thoughtful about their pedagogy.

REFLECTION: AN HISTORICAL PERSPECTIVE

Dewey(1933) described reflection as a deliberate, purposeful act that enabled teachers to use their artful skills to help students learn in meaningful ways. To do this, Dewey (1933) recognised three attitudes as important in securing the adoption and use of reflection; open-mindedness, whole-heartedness and responsibility.

Open-mindedness is the ability to consider problems in new and different ways, to be open to new ideas and thoughts that one may not have previously entertained. Whole-heartedness is being enticed and engaged by thinking. It is associated with experiencing a flood of ideas and thoughts. Interest is maintained and ideas are sought in ways in which an enthusiasm and desire for knowing is enacted. Responsibility is bound up in the need to consider the consequences of one's actions. It is the need to know why and underpins knowing why something is worth believing. Dewey argued that possession of these attitudes is important if learning is to be embarked upon in a considered and thoughtful way. Therefore, cultivating these attitudes as essential constituents of a readiness for reflection is crucial.

Having described these three attitudes as important precursors to reflection, Dewey then characterised what he considered were the five phases of reflection. He did not see these phases as necessarily occurring in any particular order but that they should fit together to form the process of reflective thinking.

The first phase is *suggestions* and are the ideas or possibilities which spring to mind when one is initially confronted by a puzzling situation. *Problem* can be described as seeing 'the big picture'; recognising the real cause for concern. It is understanding the perplexity of a situation more precisely so

that courses of action may be more fully thought through. The third phase is *hypothesis* formation and is when a suggestion is reconsidered in terms of what can be done with it or how it can be used. *Reasoning* is when the linking of information, ideas and previous experiences allows one to expand on suggestions, hypotheses and tests, to extend the thinking about and knowledge of the subject. *Testing* is the fifth phase and is when the hypothesised end result may be tested. In so doing, the consequences of the testing can be used to corroborate or negate the conjectural idea.

In outlining his five phases of reflection, Dewey (1933) discusses ways in which the phases may overlap one another and how some phases might be expanded depending on the problem at hand. He places the phases of reflection in context by referencing the learning to both past and future actions and experiences; reflection is not only "looking back" and it can persist for extended periods of time.

Dewey's theory of reflective thinking was built upon and extended by others. Bode (1940) and Rugg (1947) also wrote about an understanding of reflection that was similar to Dewey's. Rugg (1947) substituted the term problem solving for reflection and described it in four phases. He described these phases as occurring concurrently and quickly as they flashed through the mind.

During the 1950's the push for teachers to be more reflective extended from teacher preparation (Borrowman, 1956) to specific subject areas. Johnson (1956) attempted to apply the work of Bode (1940) and Dewey (1933) to the teaching of Social Studies. Hullfish and Smith (1961) revisited reflection and even though they maintained a phases approach to reflection, their

description moved from Dewey's (1933) notion of "practical deliberation" to the "reconstruction of experience."

The continued desire to produce reflective teachers and the roots of Dewey's (1933) conception of reflection carried through to the "Inquiry-oriented" approach to teacher education (Zeichner, 1983; Tom, 1984). In this approach to teacher education the deliberative, thoughtful and intelligent consideration, of actions and experiences was seen as an important basis for learning. Dewey's (1933) attitudes of open-mindedness, whole-heartedness and responsibility resurfaced as shaping factors in student-teachers' understanding of their experiences (Zeichner, 1981).

The influence of Dewey extended to a variety of teacher education programs such as those described by Feiman (1979), Berlak and Berlak (1981), Zeichner and Teitelbaum (1982), Korthagen (1985), Cruickshank et al. (1981), and Cruickshank (1985). The approaches of both Zeichner and Cruickshank drew on the traditions of Dewey (1933) but the manner in which they conceptualised the type or level of problem teachers confronted in order to be engaged in reflection differed. Cruickshank was concerned with reflection at a technical level, whereas Zeichner focussed on the quality of the educational experience and the social, moral and political principles and values influencing the experience.

Van Manen (1977) proposed three 'levels of reflectivity' for the different types of problems confronted by teachers. The first level is the technical application of educational knowledge whereby concerns are more to do with means rather than ends. The second focuses on "an interpretive understanding both of the nature and quality of educational experience, and of making practical choices. The third incorporates the moral, ethical and

political principles involved in educational thought pertaining to practical action.

Dewey's (1933) framework also involved a pre-reflective phase which was specifically characterised by an awareness of a problem situation. This stage was important because of the uncertainty which made the situation problematic, hence initiating genuine inquiry. Overlooking or misunderstanding the importance of this pre-reflective phase is particularly noticeable in the field of critical thinking (Ennis, 1962). The forms of research in this area can be described under the headings 'hypothetico-deductive' and 'problem-solving', with the problem-solving research following more closely the theoretical approach of Dewey. Kitchener & Kitchener (1981) argued that neither inductive nor deductive logic fully accounts for reflective thinking as described by Dewey. This was because each form of logic views critical thinking as a set of skills and fails to recognise the necessary uncertainty of the problem situation. The Reflective Judgment Model (Kitchener and King, 1981) was derived from research into inductive and deductive logic, and the assumptions underlying reflective judgment are similar to those which underlie reflective thinking.

The attention by Schön (1983, 1987) to reflection was the start of a new wave of research and learning about reflection. Books, papers, conferences and teacher education courses were forums for debate about what reflection is and how it might be developed and ways of categorising these approaches has been well documented (eg. Grimmer, 1988; MacKinnon 1989).

Regardless of the type of categorisation employed, it is clear that there are a number of conceptions of reflection within the educational literature. The influence of Schön's writings in the 1980's is similar to that of Dewey in the

1930's and as a consequence teacher education programs have attempted to respond to the need for teachers to be more reflective. For this study, reflection is in accord with the description initially proposed by Dewey (1933).

- MODELLING REFLECTION

My view of modelling was that through my teaching and my thinking about teaching I could demonstrate that I was a reflective practitioner and show, by example, something of the processes I went through while reflecting on practice. Aside from my 'normal classroom behaviour', the student-teachers had the opportunity to 'see' my thinking through my journal. Also, after their first school teaching experience (pre-interview 2), I started to verbalise my thoughts about my pedagogy and my pedagogical reasoning in class in an attempt to give them access to my thinking. This became an explicit act of modelling which was continued for the rest of the course. In essence, I was giving the student-teachers opportunities to hear the thoughts and ideas that influenced my actions as they occurred. When I had been reflecting about a session, I would introduce those thoughts to the class in the next session. Therefore, any of the suggestions, problems, hypotheses, reasoning or resultant testing I had been considering was open to public scrutiny. My reflection could be initiated by preparing for a session, during, or after a session. It was not uncommon for me to write in my journal during a session about what I thought was happening and why, how it matched my expectations and plans and how it might influence my subsequent classes. More overtly, I commonly thought aloud about what I was doing, the decisions I was making and why. This was particularly so if I thought the session was not meeting the learning needs of the class. I felt that these actions would model my reflection on practice.

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Choosing an appropriate time to explain that I would be 'thinking out loud' and my purpose for doing so was important. I had to have a sense of trust in the class and they with me otherwise my behaviour could appear to be peculiar rather than purposeful. There was a danger that talking aloud about what I was or was not doing, and why, could be interpreted as lacking appropriate direction. This could be exacerbated by the fact that many beginning teachers enter the course believing they can be told how to teach. It could be a risk which might compromise my supposed 'expert' position as someone responsible for teaching teachers. This paper explores the student-teachers' perceptions of this practice and its impact on their learning about teaching.

METHOD

There are a number of important strands in the methodology in order to determine if reflection could reliably be uncovered, observed, and understood in my practice and the practice of the student-teachers. Through my journal writing and the 'talking aloud' process during my teaching, the student-teachers could observe the pre-reflective phases of my thinking (as I recognised problem situations arising) and my reflection on practice. Through their journal writing, interviews and teaching I could observe and better understand their approach to reflection on practice. Therefore, attempting to uncover Dewey's (1933) attitudes and phases of reflection by student-teachers' was important in order to support the assertion that they did indeed reflect on their thoughts, actions and practice.

For journal data a proforma was constructed to accurately record the location of writings that demonstrated a disposition towards the three attitudes and/or reflective processes. These were cross-referenced against the particular topic/issue which the writing accompanied. Through this method, the data

from each journal/transcript were able to be organised so that cumulative scores for attitudes and elements of the reflective cycle could be recorded in concert with the topic which prompted the thinking (Appendices 2 & 3 illustrate the frequency of phases of reflection and attitudes).¹

A sub-set of the TAL class ($n = 9$) also volunteered to be interviewed. Interviews were conducted on four separate occasions throughout the year and always followed the same format. An interview protocol was used and the conversations were audio-taped then later transcribed. The purpose of the interviews was to develop an understanding of the participants' thoughts about teaching and learning. The interview dialogue presented opportunities to search for insights into the reasons for, and the development of, their reflective processes and is the major data source used for this paper.

Data was collected from the journals of all students in the TAL class and the transcripts from the students ($n=9$) who were interviewed during the year. However, from the group of students who were interviewed during the year, four also volunteered to be involved in an intensive interview-observation-interview cycle during their final school teaching experience. Although data from that experience is not used in this paper, involvement in that process inevitably influenced the thoughts and actions of those four student-teachers (Pearl, Perry, Sarah and Jack).

¹ In order to validate the results of coding, the descriptions and explanations drawn from Dewey's 3 attitudes and 5 phases of reflection were also used by another researcher. This served to check that others could apply the descriptions supplied for attitudes and reflective phases and to validate the accuracy of the coding of the data. In the first case Andrea's journal was independently coded and an intercoder reliability of 0.87 was achieved. After discussing the approaches used a second journal (Ralph's) was then cross-coded and an intercoder reliability of 0.94 was achieved.

Finally, in an attempt to validate my perceptions of what was happening in the TAL class, in terms of my modelling of reflective practice, an external observer (an experienced teacher in this teacher education program) 'sat in' on the class. He noted instances that he considered illustrated reflective practice. The following session he conducted an exploration of these instances with the class. In this second session, he explored the student-teachers' understanding of these instances. It was an attempt to determine how the student-teachers perceived the teaching and learning in the class, and whether or not the students viewed me as modelling reflective practice. The student-teachers (N=19 on that occasion) then completed an open-ended questionnaire and the session was audio-taped and transcribed for later analysis.

RESULTS

Modelling: Interview data

Determining whether or not my student-teachers saw me as being a reflective practitioner involved a validation process by a third person (see Appendix 1) and data from the interviews. Interview data coded under the topic of modelling had to meet two criteria. It needed to demonstrate that the interviewee recognised that I was reflecting on my practice, and that they could give examples of instances when they had observed this happening.

As stated earlier it was not until the session after the first teaching round (pre-interview 2) that I started to articulate my pedagogical thoughts and reasoning in class. All of the interviewees recognised and spoke about modelling of reflection in at least 75% of their interviews. The question, "Do I model reflection?" occurs on only eight occasions throughout the 1563 coded units from the transcripts. It is clear that recognition of modelling

was most apparent to the participants and that comments pertaining to this did not require undue prompting.

How each member of the class understood this process of modelling varied throughout the year. For some, modelling was initially seen as demonstrating some of the technical aspects of teaching (similar to van Manen's, 1977, first level of reflectivity) such as wait-time, questioning techniques or withholding judgement. Those who held this view cited examples of modelling in terms of remembering 'handy tips'.

Miranda: 2nd interview.

Interviewer: So you've been watching me teach. What sorts of questions or ideas pop into your head when you're watching me teach?

Miranda: I wonder sometimes, if you'd actually teach a Year 9 Science Class the way you teach us. Your style is very easy going and I don't know how a younger class would cope with that. I think it's good now that you tell us your processes of thinking. Like we're in a discussion and you say things like bad wait time John, and that's good because it helps to make us conscious of them. I wasn't very good at it on teaching rounds, and I noticed it on the tape [tape-analysis of a lesson], even though we'd been over it in class, but by you doing it, I'm much more conscious of it and you must say it twice a lesson now, not that I'm counting; that's one example. So I'm much more conscious of these things now and I hope that next time on rounds I'm better at it.*

*The tape analysis is a TAL assignment task where students audio-tape a lesson during their teaching round and analyse their use of language, questioning skills etc.

In a similar vein, modelling also helped to build confidence. It demonstrated that teaching is a complex task and that actions and outcomes do not always reflect that which was intended. So for some it showed that teachers at all levels face similar problems and that things did not always go 'smoothly' or 'according to plan'. In this case it modelled the reality of not just thinking about teaching but also the teaching itself.

Sarah: 3rd interview.

Sarah: I don't know (pause) your expression changes, or something in your mannerism but there's something that comes across that you're rethinking what

you're doing like perhaps your expression might change for a minute or so but you're concentrating on something else and I take it for granted then (that) when you're concentrating on something else you're revising your game plan so to speak.

Interviewer: If I do those sorts of things then what does it mean for you, for your teaching?

Sarah: ...sometimes I think that you're changing tack and I think aha, he's our tutor but he's got the same struggles that we have, he's not infallible so we don't have to be either. So when I'm in a school and I see things not going so well, I have every right to change tack, it doesn't make me a better person or something it's just that it'll be good for the students, they'll learn as much if not more, it's just a confidence boost for me.

For others, understanding involved recognition that reflection on practice was an important element in learning and thinking about teaching. Modelling reflective practice was a way of offering opportunities for others to reflect on this learning process. But, as Jack states, it is only an opportunity, and as such is an invitation, not a directive.

Jack: 3rd interview.

Jack: Well when you talk in class about what you're thinking it helps to demonstrate to us that you're reflective.

Interviewer: Why do I bother to go about it the way I do?

Jack: Because it's something we have to discover for ourselves and see for ourselves, it's not something that you can just give us. You can help us but you can't just tell us you have to reflect, you have to do it in more subtle ways.

For Pearl, modelling highlighted ways of revisiting her own practice. It gave her the chance to reconsider her actions, to reconceptualize her problems and to think about different ways of testing her hypotheses.

Pearl: 3rd interview.

With my year 11's I was particularly disappointed, they relied on me, they looked to me all the time so I was interested, when I came back from the last round, to see how you coped with it with us. I think (what you do) is sometimes there's a lot more (that) could come up but it would be in conflict (with what we're doing) and I think you make judgements about those things and close them down, also to stop us getting too sidetracked. Also, with some of the personalities you do

it to stop things going too far, that's not a bad thing, but you think about it. It's good that we get beyond the surface things and that doesn't happen much outside, maybe only one or two people do it. It's good that you point out all of the different things that are happening, I still find that very useful..

Modelling for Perry was a way of looking into the relationship between reflection and action from the teacher's perspective. It highlighted for him the need to carefully consider the alternative approaches (suggestions) possible in a pedagogical experience, and how they might offer different routes of accessibility to the learner.

Perry: 4th interview.

Perry: ...you reflect constantly and put diligent work into it.

Interviewer: What tells you that?

Perry: The fact that you sit down and prepare for class and worry about it, and it's structured and there are a lot of hidden things woven into the fabric of the lesson, you've got lots of escape hatches and doors and things to move onto, yet there's still the flexibility there that if something's working well, then we'll use more of the lesson. Also, you show that there is a sense of purpose, you say let's move on now and the subtle message is we're moving in a direction [for a reason].

Finally, Sabina intimates that modelling reflection does not necessarily present her with 'answers' to her questions. Rather, it empowers her to explore and question matters more fully than may have otherwise been the case. Hence, in her own way she is suggesting that there is a reflective cycle and that resolving a problem is part of a process, not just an end in itself.

Sabina: 4th interview.

TAL's taught me to reflect on different aspects of teaching that I might not perhaps have reflected on on such a level, I don't think it's taught me any answers. Which I don't think is a bad thing. Sometimes I just feel a little bit bamboozled, just not being able to accept anything as valid but to question everything and I think that's really hard...a concrete example of the way you've tried to show us that you're reflective is by the way you write your journal and distribute it around. It's not the most important part of the way you show us that you reflect, I think the most important way for me is the way you prompt us in the class to question our thinking, the way you speak out aloud about your

thinking which shows us that you are reflecting on what you do. But now having just said that, now remembering how we do read your journal in class we can see how what you say out loud you go on further to develop in your journal. And some of the activities I suppose forces us to think. It's quite interesting watching you in class sometimes like I noticed from the beginning of the year to the end of the year now, sometimes you just sit back and let the class run itself and you gauge whether you need to be there (involved in the discussion) and when the class needs your input.

There is an abundance of data similar to that used in this section to show how the student-teachers recognised the modelling of reflection. It became 'taken for granted' that modelling reflection was part of my teaching practice. Interview data show that by the end of the course all of the student-teachers in the interviewed sample had a good understanding of why I was talking aloud about my teaching. I did not attempt to obtain such data from the non-interviewed sample but I believe that the interviewed sample reflected the views of the TAL class as a whole. Similarly, the TAL class understood the approach I had adopted for my journal writing. However, how this modelling influenced their thinking about learning to teach varied. This could be attributed to the fact that 'telling' does not in itself lead to learning and this dictum influenced my approach to modelling such that I rarely (if ever) admonished the class to 'reflect'. Instead I chose to model its use through my practice. By adopting this approach the student-teachers were given the opportunity to accept or reject the use of reflection in their own practice, and to incorporate its use in ways which they saw as appropriate. Inevitably then, individuals drew their own conclusions about the process in their own time.

By the end of the year, all of the student-teachers who were interviewed recognised that my modelling of reflection was designed to highlight an often hidden and somewhat implicit aspect of teaching. But the path to understanding was constructed differently by each individual. This is not

meant to imply that the participants were unable to reflect on their practice without it being modelled. Rather it highlighted the processes for them and subtly challenged their understanding of the use of reflection on practice.

Stephen: 4th interview.

Interviewer: Do you think you'd have considered reflection in this way if you were in a different class?

Stephen: No I don't think I would've identified it. I guess the fact that you've said this is reflection and you've been through it now I think hey I've been doing that but it's just been sort of done without putting much effort into it, now I do and I recognise it as reflection time and developing it rather than it just being something you can do.

Modelling reflection on practice gave the student-teachers an opportunity to see how it may be used to shape learning about teaching, and teaching practice. Although all of the students who were interviewed readily acknowledged that I modelled reflection on practice, the usefulness of this exercise is more appropriately tested by the value they placed on it.

Valuing reflection

For interview data to be coded under the heading of 'valuing reflection' the interviewee needed to show how or why reflection, or the modelling of reflection, was valuable for their teaching or learning about teaching. Simply stating that it was valuable was not sufficient.

For the interviewees, making sense of what they were experiencing raised a number of questions. Is reflection a personal characteristic found in some people but not others? Do these personal characteristics therefore govern the use of reflection on practice? Does reflection on practice make for a 'better' teacher? How much does experience influence the ability to reflect on practice? Questions such as these were detected in the interviews. Their answers influenced their understanding of the value they placed on

reflection. Also, as in the case of modelling, it was difficult for some to disentangle the actions from the individual. I was both their tutor and the researcher and, in one sense, this made it difficult to determine that which was being valued. Although this was not always apparent, it did sometimes seem as though the distinction between me as a person and me as a reflective practitioner was blurred. As the previous section shows, it was widely accepted that I was a reflective practitioner, but for some, it was more a matter of that being my style of teaching rather than as something that could be applied to teaching generally. This point is demonstrated by Andrea.

Andrea: 2nd interview

Andrea: This is a different field for me, because in my Degree and even in H.S.C. [final year of high school] my classes have been on the board with a lecture, you're given the theory or a prac. sheet and then you do it. Whereas these classes [TAL] are all new to me. I've never been in class discussions where opinions and views are thrown around so I really can't compare it, it's new. It's something I haven't done for years.

Interviewer: Is that the same in all of your classes?

Andrea: Don't ask me to compare you to [another method lecturer]. I can't compare it. In TAL I can see the purpose of it, in Maths methods I think they're wasting my time.

Interviewer: What makes it that way?

Andrea: Well maths is presented in the lecture form, you hear it, you see it, it's up to you to apply it. You don't see it applied or used. It's really hard to compare to TAL, they're just two different things.

Understanding that teaching is purposeful and goes beyond conveying information can, as in Andrea's case, be in conflict with prior experiences. Therefore, the consequent value placed on the learning outcomes may be interpreted as a result of the teaching style, not the reflective underpinnings to the practice. Hence, for Andrea, she initially found this quite difficult. In fact, this led her to compare individuals and their

teaching style rather than the possible reasons for it. The transcript demonstrates that she values what is being done but does not recognise why it is occurring. However, Jack readily acknowledges and recognises the value of having reflection modelled. He quite clearly sees a purpose for the exercise and how it applies to learning about teaching. His understanding of the value of reflection is different to Andrea's. Even at this early stage (2nd interview) Jack is capable of abstracting from learning and thinking about teaching to teaching itself. He has no difficulty in differentiating between the reflective processes and me as a person. He views the modelling of reflection as a way of understanding pedagogy and distinguishes this from personal attributes.

Jack; 2nd interview

You tend to forget that you need to do that [reflect] as a teacher, so it [modelling] highlights it a bit more, the decisions and what you're doing. It'll get us thinking about the decisions that you have to make in front of the class so it's maybe not as new to us when that situation comes on us when we're teaching. You are always stressing the fact that you do have to be thinking when you're a teacher as well, that's one of the things you're stressing, you have to always be analysing, deciding, making judgements...I can see you looking around, thinking into space, it's hard to see that with other people. You're more aware of those sort of things, you let us know you're more aware. I think it's a valuable thing. Also, by you opening up and telling us what you're thinking, it helps our relationship with you it makes us feel more comfortable because we know that you're opening up to us so we can as well, that's one part of it apart from the fact that it emphasises that you should be thinking.

The value Jack placed on reflection continued to develop throughout the course. He incorporated reflection into both his teaching and his learning. He genuinely believed that if he reflected on his teaching it could lead to better learning outcomes for his students.

Jack; 3rd interview

...it means my teaching will be better for it [reflection] because you're more in tune with what's happening, what your kids are learning. It's not easy during a lesson because there's so much to think about. You've got to make time to reflect and not to have the pressure on you all the time as the focus.

He also believed that the use of reflection could enhance the quality of his own learning.

Jack 4th interview

Jack: There are so many different ways to learn, you learn by listening to people and by looking at things, you learn by doing it in a manual sort of way, often you learn when something just sort of hits you but it's not a conscious effort like something stimulates you like the light bulb flashes. I think I do tend, once it's happened initially, I do try to reflect on it, it usually happens, whether that's a case of reading over my notes, sometimes it's by asking some questions or doing some reading, I think I've done that a bit it reinforces it I often reflect on it a couple of times on some things, to help reinforce it, particularly if it's something difficult. I quite like to read too, and I often try to read if I don't understand something because I like to learn it in my own time. I think I've made more of an effort to try and analyse things more at the time this year probably through your coaching it's happened to an extent but I'm still working on that.

Interviewer: What sorts of things have prompted you to do that?

Jack: Your encouragement and your comments in my journal and things like that, and through that my recognition that that is probably a better way to optimise my learning, because then you have two exposures to it so you can analyse your reflections more than once. I do ask myself lots of questions and I've come to recognise that this year.

Jack's incorporation of reflection into his practice is an explicit example of valuing reflection. He demonstrates a fine understanding of the value of having reflection on practice modelled, and how that influences his teaching and learning.

Reflection was most commonly valued as a learning about teaching tool. All of the interviewees spoke about the relationship between modelling and its value for demonstrating how they could apply it to their own practice. They felt that this was important because it helped them to focus more on some of the mechanics of teaching. This seemed to be reinforced by my thinking out loud. Many of the students saw this as a 'self-correcting' process and something that was a teaching skill that they could use.

Miranda: 4th interview

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...after you've done something you might consider that you could've done it differently and you tell us. I think it's important because we have to kind of be into the process of thinking that way ourselves, we probably won't say that to a class, but I think you have...I think it, whether we're conscious of it or not, we, oh well I have, started to do the same thing. I mean I've sat there in class and asked a question and thought oh no I shouldn't have done that and I find myself looking back on things that I've done at school or on the last teaching round or a week ago or something and thinking about how things worked then, if they did or didn't work and how I could change them. Just going back and reflecting on what I've done in the past.

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Pearl: 2nd interview

...it [modelling] has a lot of impact on how I think I should teach, whether you can actually see that in my teaching I'm not sure. Yeah it has an impact, it makes me think about how I should change my stuff, but that actually doing it is different. But it's given more examples or possibilities about how to do something so I've got more practical examples of saying well perhaps I could use this or....

---§---

Sarah: 3rd interview

Well for one thing I had a class that wasn't going well, I had split them up into groups and it wasn't going well, and I thought to myself well it doesn't really matter if I change my plan because it's probably better for them to work on their own anyway so just the fact that I'd think back to perhaps you changing your tack or whatever, and you've said a few times that this hasn't gone the way I've wanted it to go, but I've seen that by doing that it hasn't hurt the class at all but I haven't been put off by thinking no this isn't working I'll change it, I mean it hasn't fazed me in a way that I've thought oh no, the rest of my class is going to be awful.

The value of reflection for these student-teachers is that it gives them the confidence to test their hypotheses about their teaching and their students' learning. They are able to think about what they are doing and why and reason through their problems so that their pedagogy is more appropriate to the given situation.

This practical application of reflection is interesting and is a common and concrete form of valuing reflection on practice, particularly when confronted by something new. The need to understand the mechanics of the situation precedes an understanding, and valuing, of some of the more

abstract principles. Except for Nigel, all of the interviewees spoke about the value of reflection in terms similar to those of Miranda, Pearl and Sarah. Nigel was never able to cite examples from his own teaching. He generally spoke about what might be possible, not what he did do. But, he was at a disadvantage compared to the rest of the cohort. He was a part-time student and completed only two of the three school teaching experiences.

To be able to value reflection most likely requires teaching experiences that challenge the individual beyond just coping with classroom management or control. There needs to be a focus on the pedagogy which transcends the transmission of factual information. This was demonstrated at two levels. First, with the exception of Nigel, all of the student-teachers felt that they were beyond simply surviving in the classroom, also, because they had some (albeit limited) teaching experience, they valued new ways of viewing their work. This was how they saw reflection, as a tool to analyse their teaching.

Perry: 2nd interview

Well in TRL you encourage us to question and reflect on your teaching so that when we go out and we get out of that survival mode type of thing that we try and improve on some aspect of our teaching...that's what I believe you're on about, I don't know if it's verbal, but that's what I believe it's on about.

The second level of this approach is linked to the breadth of experience necessary to act on the problems recognised through reflection. Having had some teaching experience and being concerned with how they were 'performing' poses a dilemma due to the limited range of suggestions possible from their own experience. They are not 'experienced' teachers with an array of ways to teach particular content, therefore their suggestions are limited and this affects their ability to test their hypotheses.

Sabina: 3rd interview

I know that I'd like to be a flexible teacher and that's what it [value of reflection] is. But I think it's something that's going to take a little while to achieve, I have

to be comfortable with the curriculum, I think it would depend on the school and lots of other things.

By the same token though, the exploration of appropriate pedagogy in context (type of: school, students, content etc.) is not linear. It is not a search for an end-point, more so, a search for understanding. The value of reflection is something greater than the ability to devise and conduct a good lesson. Sabina attempts to articulate this point during her third interview.

Sabina: 3rd interview

I've seen teachers in lots of different areas, I think you reflect on your teaching. I don't think that - I don't want to name names - in some other subject areas that people reflect because if the strategies haven't had any affect they haven't been altered. Yet, other lecturers here are so secure in the way they teach something to Dip. Ed. students that they think they have the teaching experience so they know what they're on about so I don't think they can reflect very much or that if they do it doesn't show in their teaching...in schools I think quite a few teachers do reflect on their teaching, they might not have a great deal of time to sit down and analyse in depth but they reflect on the success or failure of what they were doing in their classroom and I think that will reflect on how they teach future units, even if it's just to do with the curriculum. Like if it's English and it's a book and it gets a poor reaction then there's no way that you'd set it again, you'd look for an alternative, if the kids don't engage in the text then it's pointless just hashing it to pieces. I think some teachers remember the things that were successful in the classroom, they do try to use them again. Then I had one example of a teacher who said come and watch this whiz bang lesson and it was, it was a great lesson getting year 7 into poetry. But I thought he's got that really set in his mind how to teach that, it works for him and it works really well and the kids gain a lot from it but I think he probably teaches that to the year 7's year in year out, that's his one good lesson. You just wonder how much reflection's gone into that...[then musing to herself] is it necessary to reflect on everything. If it's successful, why change it?

One possible difficulty related to how the student-teachers understood reflection, and thus valued it, is that I never outlined any of the fundamental or philosophical underpinnings to my view of reflection. I did not ever give a formal definition of the term, nor did I outline any of the major theoretical conceptions of a reflective cycle eg. Dewey (1933), or Schön (1983). Rather, I left the development of understanding to the individual and attempted to rely

on modelling as the most important form of teaching about reflection. Any form of valuing that was implicit in the student-teachers' conception of reflection was inter-woven with their understanding of reflection. Although this may be regarded as a methodological weakness by some, for me it ensured that I was genuinely researching how student-teachers learnt from modelling reflective practice. They did not have an explicit and well defined research protocol to follow that might encourage them to tell me what they thought I might like to hear. Consequently, Perry's statement during his fourth interview is a fitting way of demonstrating that reflection and the modelling of reflection was indeed valued by the participants in this group.

Perry: 4th interview

Perry:....I like to watch you in DLE you're more interesting than what's going on, just watching you thinking what am I going to do here, which area am I going to go on with now, how long will we spend on this task, how many people have finished, people are getting fidgety others are still reading, this is working, this isn't working, where to from here. All of those are sort of obvious, but then when you're doing your own teaching you've got to sort of go back and say well what worked here and what didn't? How much time should I spend on this, am I going down the right track, is there a better way I can present it etc. So they happen, and I guess that's the reason that I reflect is that I can see the value in it.

Interviewer: Where do you see the value in it?

Perry: By improving and by learning about teaching, and teaching about learning. So the reason I reflect is for personal growth plus professional development. They're the two areas that I see as reflection, because once something's over if you can gain something from what went before then there has to be an advantage I suppose, that's where I see reflection.

The reflective cycle

Phases of the reflective cycle were tallied from the transcripts of each interview (see Appendix 3). The move from the unstructured format of the journal, in terms of both time and writing, to the semi-structured and regularly conducted interviews had a major impact on the number of coded

segments recorded. During the interviews, participants were questioned and probed about their views and were given more explicit foci for their dialogue than was the case for their journal writing. As a result, the number of coded segments of the reflective cycle for each participant is markedly higher from the interviews as opposed to their journal writing.

Another reason for the differences between the number of coded segments for phases of reflection in relation to journals and interviews is that the interview structure was designed to place the interviewees in a position which challenged them to reflect. Therefore, they were being encouraged to talk about how they would think in a given situation and why and how this could impact on their actions. Although the questions were not individually of that form, the sequence of questions created that scenario. So it is only reasonable to expect an increase in responses for each phase of the reflective cycle. Also, the interviews gave the opportunity to probe the participants' use of the reflective cycle as a whole. As a data source, this increases the understanding of how an individual actually approaches reflection. Miranda's second interview is a good example of this point. It demonstrates the complex nature of reflection and how the linking of episodes creates opportunities for enhanced understanding and learning. (Phases of the reflective cycle are included in the transcript for ease of identification: S = suggestions, P = problem etc.).

Miranda: 2nd interview

Interviewer: If you had to teach a topic that you were unfamiliar with, how would you do it?

Miranda: I wouldn't teach it until I felt comfortable with it. To do that I'd find out as much as I could about the topic [S 1]. I don't really think that I could go into a classroom not knowing much about the topic and carrying it off successfully, because I think I'd lack the confidence [P]. I feel that if I knew the subject matter and was confident with it I'd be willing to try different methods and strategies in the class room [H]. On the teaching round I found myself teaching the topic of Insurance to business education. and most of the stuff I did

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with them was chalk and talk, whereas I compare that to my Year 10 criminal law class that I knew a lot about and I felt really comfortable with the topic and I did heaps of stuff with them, role-plays, videos, because I felt comfortable with the topic [S 1 & R]. I really understood it so I was more willing to take risks and do things that were a bit out of the ordinary rather than just chalk and talk [T].

Interviewer: Did you recognise in your Business Education class that you were more boring?

Miranda: Yeah.

Interviewer: When did it occur to you?

Miranda: Probably after I had taught about two lessons of it. I wasn't happy, I was trying to do things differently, I did a few worksheets for them, I found this video that they seemed to like but because I wasn't as familiar with the topic [S 1]. I tended to stick to my structured notes and didn't really deviate from them [T]. But my criminal law class I hardly looked at my notes, the kids would ask me questions and that was fine, I could answer them straight off.

Interviewer: You said in Criminal Law you would take more risks. What do you mean by that?

Miranda: Just to do something out of the ordinary with the students.

Interviewer: Why would you do that?

Miranda: Because I thought it would help their learning more. Like I did a role-play with them, which I think given the same opportunity if I didn't understand what was going on I wouldn't have. The kids loved it and I used it in the next lesson after that and after that to draw it back, you know to say what did Hugh do when he was Clerk of the Courts? [R]

Interviewer: If you think of those two classes, how does your planning for the two different classes vary?

Miranda: When I was planning Business Education I was more concerned with me, whether I would understand it. Criminal Law I was more concerned with the students, how they'd be taking it. I was fine so I was more receptive to how they'd understand. [R]

Interviewer: And when you walked out of the classes, what sort of thoughts did you have?

Miranda: After Business Education, I thought Thank God, it's over. After Crim., really good. In fact most of the time after Crim. I had lunch and the kids would stay in and ask me questions, they found it fascinating, so I always felt really happy, like I'd achieved something. The kids would come in next lesson and they'd seem more eager.

Interviewer: Did you notice any difference in the way you thought or questioned during the two lessons?

Miranda: Yes, my Crim. classes I was more prepared to have a less structured lesson, like I was more prepared to have students ask me questions and I was pretty quick with the answers, there was more class discussion. I did tape one of these lessons and it was more of half me and half them, but in Business Education, I did most of the talking, I directed it. I had a few times when they asked me questions and I didn't understand the content and I just tried to bluff my way through it [T 2].

Interviewer: So you recognised those differences when you were teaching?

Miranda: Yes, and after the round I thought I could've been better prepared [S 2]. Like what [another TAL staff member] was saying sticks in my mind saying about being able to teach anything at all as long as you stay a lesson ahead of the kids [P 2]. Some people might be able to, but not me and that's what I've been thinking lately, I feel much more comfortable teaching things that I know about [H 2]. I don't agree with [the other TAL staff member] it might be fine for some people, but I would question how much the students are getting out of it. They would sense that you didn't know much more [R 2].

Interviewer: So that statement of [other TAL staff member] from about four months ago, you re-visit?

Miranda: Constantly.

This transcript shows how Miranda is reflecting on a teaching experience and then linking the learning from that to a statement made by a lecturer at the beginning of the year. The two reflective cycles combined demonstrate how a problem from one situation can be revisited through another. This conversation clearly illustrates the point that the sequences of the reflective cycle are not fixed but may occur in any order. It also supports the notion that testing does not have to lead to the immediate resolution of a problem. So the reflective cycle, as demonstrated by Sabina, can occur over an extended period of time with testing leading back into the cycle again. The context of one scenario influences the reflective processes of another.

The difference between data from the journals and data from the interviews is interesting (see Appendix 2 & 3). The interviews encouraged the participants to think and allowed them to demonstrate their reflection more fully. In the journals, individuals did not have to respond to the prompting and probing of others unless they chose to; the very nature of interviews makes it difficult not to respond. The two data sources serve different purposes and each are important in their own right for showing that these student-teachers do indeed reflect on practice. However, Miranda's data is considerably different to all the others. She is the only participant whose number of coded entries is greater for the journal data (problem and testing) than for her interview data (see Appendix 3). Miranda may well be illustrating that her thinking about teaching is not as markedly influenced through the interviews as the rest of the cohort and that her writing more fully demonstrates her reflection. She may be the type of developing reflective practitioner who questions all aspects of her reflective cycles as she works toward her ideas that she wishes to test.

Appendix 3 also demonstrates that testing is the least employed phase of the reflective cycle and therefore perhaps the most difficult, or the most sophisticated level of use of reflection. Testing requires one to try an alternative approach to a problem situation. Throughout the interviews the distinction between what might be possible to test as opposed to what an individual would do or had done in a given situation was apparent. This was particularly so for Nigel and highlights again the role of experience in reflection on action. Although Appendix 3 does not show any definitive pattern or trend in the change of use of the reflective cycle over time, the transcripts demonstrate an increase in the quality of reflection over time. Examples of testing moved from thoughts to actions and the use of reflection became more defined and purposeful. Miranda demonstrates this point well

as she reflects on her past experiences, and the risks she was prepared to take in her teaching. Thinking as she does illustrates how reflection influences the type of testing she performs, the learning she gains from it, and how reflection on that experience influences her view of future action. She no longer thinks about what she might do, she thinks about experiences that shape what she does (or will) do.

Miranda: 4th interview

Interviewer: If you had to teach a topic you were unfamiliar with, how would you do it?

Miranda: First thing I'd do, I wouldn't go into the class unless I was confident that I knew something about it (P 1), but I think now it's quite possible to learn something yourself so that you can go and teach it (H 1), I'd probably speak to other teachers who've taught it before and who know about it and ask them for different ways of doing things, and see if they can direct me towards different resources for me to learn something myself and to use in the classroom. Once again I'd probably rely on other staff who've taught it before then I'd go and try to learn by watching videos reading through text books, newspapers etc. so that I had confidence in the subject before I went out and tried to teach the students (S & R).

At the start of the year I probably wouldn't like to have taught something I wasn't sure (P 1) of basically because I think if you understand the subject matter, you're more confident and more able to or more willing to try different things in the classroom (H 1) and not as worried about students tripping you up knowing more than you. Now however during the year it probably wouldn't worry me because I've been in the situation of teaching something that I knew nothing about before I got to the school and I did all of these things, talked to other teachers, read books looked at videos and so forth and I probably wasn't as confident as teaching it but I was happy to do so. Now I got out of it I did a lot of student centred activities, I'd let them find out things and they'd then tell me [T], I had to teach Cambodia and the Pol Pot regime and I had no idea, but it was good fun though. So no, I don't think it would phase me though I'd make sure I knew something about it before I went into the class though.

CONCLUSION

The work of Schön (1983, 1987) has been a catalyst for the recent interest and research on reflection and varying conceptions of the nature of reflection have been well documented. Zeichner (1983) and Tom (1985) described some of these: teachers as action researchers, inquirers, problem

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solvers, hypothesis makers, self-monitors and analysers. It is little wonder then that teacher educators have sought to introduce and develop reflection in pre-service education courses; student-teachers should be encouraged to develop along the lines of these descriptors. A major goal of this study was to enable student-teachers to develop the pedagogical habits, skills and attitudes necessary for self-directed growth, and in so doing better understand the development of their reflective processes.

Erickson (1988) poses the dilemma that confronts many teacher educators as they attempt to facilitate student-teachers' learning about teaching, and hence, learning about reflection.

Reflection that occurs in the context of 'the giving of reasons to the learner'...must also be mediated by a consideration of what is 'reasonable' in a particular learning situation. And it is precisely in this mediation process between these two principles that Shulman [1988] claims 'the traditions of technical rationality...and reflection and action must come together. These are not competing principles.' (p. 196)

Trying to map a path in pre-service education that would allow this mediation to occur is what led to the development of the approach to modelling adopted for this study. I believed that if student-teachers were to learn about reflection, they needed to be given continual opportunities to view it in action. As reflection is a cognitive process, access to such thinking needed to be possible in ways that allowed it to be observed and understood across a range of teaching and learning contexts and in a number of observable forms. Thus the incorporation of the 'thinking aloud' approach in my teaching, and my open and honest personal reflections on the teaching and learning in the TAL class described in my journal. It was also important to me that individuals were able to draw their own conclusions about the use, value, and development of reflection on action for

teaching practice, and that is why the research method adopted was employed without the technicalities of the reflective cycle and its coding ever being outlined to the TAL class. It was also as much to test whether Dewey's (1933) descriptions of the phases of reflection could be seen in student-teachers' thoughts and actions as it was to ensure that the student-teachers did not act, or write, in ways that might be influenced by any detailed knowledge of what I might be looking for. The general notion of being reflective was the extent of my explanations of my research purposes and approaches.

As the interview data shows, learning from and through experience is important for student-teachers in the development of the skills of reflective practice and is very closely linked to their teaching experiences. Enhancing reflection in student-teachers through teacher education programs is then most likely if there is an overt link between reflection and their teaching experiences; it is much more internalised when it is focussed on the individual's own thoughts and actions.

The thinking aloud format and the journal writing used in this study are heavily dependent on a trusting classroom environment and good tutor-student-teacher relationships. For me, the thinking aloud format produced some of the most interesting data about modelling. Giving student-teachers immediate access to my thoughts and concerns during teaching demonstrated for them that even experienced teachers can continue to find teaching problematic. Student-teachers often perceive experienced teachers' lessons as moving smoothly and methodically from an introduction to a conclusion. To them, it may sometimes appear as though each step, including students' responses and actions, are known in advance to the teacher. By being privy to the thoughts that influenced my practice this

belief was de-mystified as they saw and heard my pedagogical struggles (both cognitive and affective) with their learning about teaching.

One of the most heartening aspects of this element of the research was the fact that many of the participants spoke about how this modelling practice influenced them. It encouraged them to be comfortable with similar struggles with their own pedagogy and helped them to realise that this was an important part of teaching. It also highlighted for many that even though the members of the class were party to the same pedagogical experiences, they did not experience the same learning outcomes from those experiences. This was important because it paralleled the position of their students' learning when they were teaching, and it also demonstrated that there was not one way to teach particular content (or one way to learn to teach). Similarly, for their teaching and their students' learning, they saw by experiencing it themselves, that to enhance learning across the range of students in a class, pedagogy must be responsive to different learners. To do that, reflection on action is fundamental.

The interview data gave insights into the student-teachers' views of their own practice and their use of reflection and illustrates that student-teachers should not simply be told the mechanics of reflection, then be trained in such methods to apply them generally to their pedagogy. They must experience reflection as a part of their own learning about learning and teaching; then they can, and will, decide how to apply it in their own practice as they better understand how their pedagogy is shaped by the context of the teaching-learning environments in which they work.

Reflection is something that when understood and valued (by teacher educators and student-teachers) can be developed through teacher education

programs where teacher educators practice what they preach. By approaching teaching in pre-service education in this manner teacher educators will encourage their student-teachers to do likewise.

This paper was designed to explore how the modelling of reflection by a teacher educator influenced the development of pre-service teachers' thinking and learning about teaching, and their subsequent reflective processes. The data support the notion that modelling of reflection is possible and can be successfully incorporated into learning about teaching and that modelling reflection, and reflection itself, were valued by the participants in this study. Therefore if teacher educators consciously and purposefully considered their own pre-disposition to, and use of Dewey's (1933) attitudes and reflective phases in relation to their practice, it would indeed be beneficial in actively encouraging such practice in their students.

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Appendix 1:

The questionnaire that the students completed when an external observer visited the TAL class (N=19) comprised three statements, each of which respondents were asked to rate by placing: a double tick next to the one which was most often the case, and a single tick for those that had occurred at sometime throughout the year. For each statement, an open-ended response was also sought. The numerical results associated with each of the three statements is outlined below in Table A1.

Table A1: Questionnaire results.

Statements.	double tick	single tick	no tick
He makes me think and is confusing.	1	9	9
He makes me think and is helpful.	18	1	0
He does not make me think.	0	2	17

The open-ended responses to these questions demonstrate a wide range of reasons. Confusion (statement 1) is particularly interesting because it is seen as something positive. For many of the student-teachers who marked this statement, being confused was a precursor to sorting out the issue at hand. Therefore, confusion may encourage thinking, or be an outcome of it. Tables A1 and A2 (Table A2 summarises the themes from the open-ended responses proposed by the participants) both demonstrate that the student-teachers readily recognised the thinking and learning approaches used in their TAL sessions. They appear to be adequately challenged by the pedagogical approaches used and were clearly thinking about their own teaching and learning.

Table A2 Themes from the open-ended responses on the questionnaire.

Statement	Reason suggested	Number of responses
He makes me think and is confusing, and/or, he makes me think and is helpful.	Thinking about myself.	4
	Thinking about Dip. Ed	2
	Confusion leads to reassessment of thinking.	3
	Thinking about what/how I learn.	9
	Thinking about how others learn.	6
	Thinking about teaching or teaching strategies.	15
	Thinking about students.	2
	Thinking about the way John teaches.	2
He does not make me think.	Does not challenge me enough about my students' reactions.	1
	Does not make me think deeply enough.	1

Appendix 2:

Number of coded journal entries per student per phase of the reflective cycle and attitude.

Name	Group	PHASES OF REFLECTION					ATTITUDES		
		Sugg*.	Prob.	Hyp.	Reas.	Test.	O/M.	Resp.	W/H
Pearl	Int.	35	40	35	26	17	43	30	18
Miranda	Int.	29	28	28	24	19	41	37	17
Jack	Int.	20	24	24	19	9	41	32	19
Nadine	No Int.	17	20	19	10	3	19	12	3
Perry	Int.	16	17	17	16	14	37	23	8
Sarah	Int.	16	15	12	9	4	24	21	7
Sabina	Int.	13	16	15	12	5	35	26	11
Stephen	Int.	13	13	13	9	5	28	20	8
Ralph	No Int.	13	21	9	0	3	15	4	0
Sharon	No Int.	11	13	14	7	7	19	6	2
Filipa	No Int.	9	14	14	4	5	27	15	6
Mitchell	No Int.	9	16	10	3	2	18	10	2
Peggy	No Int.	8	16	18	12	4	24	11	3
Marg	No Int.	8	15	9	2	0	26	2	0
Nigel	Int.	8	11	11	7	0	35	15	3
Andrea	Int.	6	10	6	2	0	13	4	0
Antony	No Int.	5	9	7	2	3	13	6	0
Joshua	No Int.	5	5	3	0	0	16	3	1
Trixie	No Int.	3	8	5	4	1	25	12	8
Total		244	311	269	168	101	485	289	116

*(Suggestions, problem, hypothesis, reasoning, testing: Open-mindedness, responsibility, whole-heartedness).

Appendix 3:

Number of coded interview and journal segments of transcript for each phase of the reflective cycle per interview.

Name	Interview time	Suggestions	Problem	Hypothesis	Reasoning	Testing
Andrea	1	27	11	4	6	0
	2	24	9	5	4	3
	3	25	5	5	5	2
	4	28	7	2	8	4
	Total	104	32	16	23	9
	Journal*	6	10	6	2	0
Jack	1	40	11	8	6	2
	2	47	10	16	9	2
	3	49	8	8	8	1
	4	73	15	14	22	8
	Total	209	44	46	45	13
	Journal	20	24	24	19	9
Miranda	1	39	4	7	7	2
	2	43	6	10	9	5
	3	46	2	4	10	3
	4	52	5	12	17	6
	Total	180	17	33	43	16
	Journal	29	28	28	24	19
Nigel	1	29	7	8	8	5
	2	42	12	19	13	6
	3	33	8	10	14	5
	4	24	6	12	9	6
	Total	128	33	49	44	22
	Journal	8	11	11	7	0
Pearl	1	44	12	15	16	3
	2	35	15	9	7	6
	3	26	12	9	14	4
	4	36	17	10	17	5
	Total	141	56	43	54	18
	Journal	35	40	35	26	17
Perry	1	64	10	11	14	7
	2	51	19	18	25	11
	3	31	17	13	14	5
	4	43	20	17	26	11
	Total	189	66	59	79	34
	Journal	16	17	17	16	14
Sabina	1	37	7	6	6	1
	2	32	11	11	8	4
	3	42	6	5	7	3
	4	25	8	6	10	4

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AERA, San Francisco, April, 1995.

	Total	136	32	28	31	12
	Journal	13	16	15	12	5
Sarah	1	39	6	9	9	3
	2	29	9	10	11	8
	3	32	8	5	13	4
	4	25	8	7	12	4
	Total	125	31	31	45	19
	Journal	16	15	12	9	4
Stephen	1	40	6	7	9	2
	2	32	20	16	13	8
	3	36	7	9	12	7
	4	26	11	6	12	6
	Total	134	44	38	46	23
	Journal	13	13	13	9	5

*Journal: figures taken from Appendix 2, number of coded journal segments from student-teachers' journals.